

**What is claimed is:**

1           1.    A liquid crystal display with an integrated  
2 color filter, comprising:

3                an active matrix substrate with a plurality of  
4                       switching elements;

5                an insulating layer formed on the active matrix  
6                       substrate;

7                a double-organic layer formed on the insulating  
8                       layer;

9                a plurality of pixel electrodes formed on the  
10                       double-organic layer, and electrically  
11                       connected to the respective switching  
12                       elements via a plurality of respective  
13                       contact holes;

14               a substrate positioned a predetermined distance  
15                       above the active matrix substrate; and

16               a liquid crystal layer between the two  
17                       substrates.

1           2.    The liquid crystal display with an integrated  
2 color filter as claimed in claim 1, wherein the double-  
3 organic layer comprises a plurality of color-filter units  
4 and a transparent organic layer.

1           3.    The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the color-  
3 filter units layer is formed above the transparent  
4 organic layer.

1           4.    The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the  
3   transparent organic layer is formed above the color-  
4   filter units layer.

1           5.    The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the  
3   transparent organic layer is formed of polycarbonate or  
4   acrylic-resin.

1           6.    The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the light  
3   transmission of the transparent organic layer is above  
4   90%.

1           7.    The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the  
3   dielectric constant of the transparent organic layer is  
4   2.6-3.6.

1           8.    The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the thickness  
3   of the transparent organic layer is 1.5-3.5 $\mu$ m.

1           9.    The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the  
3   dielectric constant of the color-filter units is 3.5-5.0.

1           10.   The liquid crystal display with an integrated  
2   color filter as claimed in claim 2, wherein the thickness  
3   of the color-filter units is 1.0-2.0 $\mu$ m.

1           11. The liquid crystal display with an integrated  
2 color filter as claimed in claim 2, wherein the color-  
3 filter units includes red, green and blue units.

1           12. The liquid crystal display with an integrated  
2 color filter as claimed in claim 1, wherein the pixel  
3 electrodes are made of indium tin oxide.

1           13. The liquid crystal display with an integrated  
2 color filter as claimed in claim 1, wherein the contact  
3 holes pass through the insulating layer and the double-  
4 organic layer.

1           14. An integrated color filter, comprising:  
2           a substrate;  
3           a plurality of switching elements formed on the  
4           substrate in a matrix arrangement;  
5           an insulating layer formed on the switching  
6           elements;  
7           a transparent organic layer formed above the  
8           insulating layer;  
9           a plurality of color-filter units formed above  
10          the transparent organic layer; and  
11          a plurality of pixel electrodes formed above  
12          the color-filter units, and electrically  
13          connected to the respective switching  
14          elements via a plurality of respective  
15          contact holes, wherein the contact holes  
16          pass through the transparent organic  
17          layer, color-filter units and the  
18          insulating layer.

1           15. An integrated color filter, comprising:  
2           a substrate;  
3           a plurality of switching elements formed on the  
4           substrate in a matrix arrangement;  
5           an insulating layer formed on the switching  
6           elements;  
7           a plurality of color-filter units formed above  
8           the insulating layer;  
9           a transparent organic layer formed above the  
10          color-filter units; and  
11          a plurality of pixel electrodes formed above  
12          the color-filter units, and electrically  
13          connected to the respective switching  
14          elements via a plurality of respective  
15          contact holes, wherein the contact holes  
16          pass through the transparent organic  
17          layer, color-filter units and the  
18          insulating layer.

1           16. A method of fabricating an integrated color  
2          filter, comprising:  
3           providing a substrate;  
4           forming a plurality of switching elements on  
5           the substrate in a matrix arrangement;  
6           forming an insulating layer on the switching  
7           elements;  
8           forming a transparent organic layer on the  
9           switching elements, wherein the  
10          transparent organic layer has a first hole

11 exposing a part of the surface of the  
12 insulating layer;  
13 etching the insulating layer by using the  
14 transparent organic layer as an etching  
15 mask to form a second hole in the  
16 insulating layer, wherein the second hole  
17 joins the first hole and exposes a part of  
18 the surface of the switching elements;  
19 forming a plurality of color-filter units with  
20 a third hole on the transparent organic  
21 layer, wherein the third hole forms a  
22 contact hole together with the first and  
23 the second holes to expose the part of the  
24 surface of the switching elements; and  
25 forming a plurality of pixel electrodes on the  
26 color-filter units, wherein the pixel  
27 electrodes are electrically connected with  
28 the switching elements via the contact  
29 hole.

1 17. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the transparent  
3 organic layer is made of polycarbonate or acrylic-resin.

1 18. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the light  
3 transmission of the transparent organic layer is above  
4 90%.

1           19. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the dielectric  
3 constant of the transparent organic layer is 2.6-3.6.

1           20. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the thickness of  
3 the transparent organic layer is 1.5-3.5 $\mu$ m.

1           21. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the dielectric  
3 constant of the color-filter units is 3.5-5.0.

1           22. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the thickness of  
3 the color-filter units is 1.0-2.0 $\mu$ m.

1           23. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the color-filter  
3 units includes red, green and blue units.

1           24. The method of fabricating an integrated color  
2 filter as claimed in claim 16, wherein the pixel  
3 electrodes are made of indium tin oxide.

1           25. A method of fabricating an integrated color  
2 filter, comprising:

3                 providing a substrate;

4                 forming a plurality of switching elements on  
5                         the substrate in a matrix arrangement;

6                 forming an insulating layer on the switching  
7                         elements;

8 forming a plurality of color-filter units with  
9 a first hole on the insulating layer;  
10 forming a transparent organic layer on the  
11 color-filter units, having a second hole  
12 to expose the first hole;  
13 etching the insulating layer by using the  
14 transparent organic layer as a mask,  
15 forming a third hole in the insulating  
16 layer to expose a part of the surface of  
17 the switching elements, wherein the third  
18 hole forms a contact hole together with  
19 the first and the second holes; and  
20 forming a plurality of pixel electrodes on the  
21 transparent organic layer, wherein the  
22 pixel electrodes are electrically  
23 connected with the switching elements via  
24 the contact hole.

1 26. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the transparent  
3 organic layer is made of polycarbonate or acrylic-resin.

1 27. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the light  
3 transmission of the transparent organic layer is above  
4 90%.

1 28. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the dielectric  
3 constant of the transparent organic layer is 2.6-3.6.

1           29. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the thickness of  
3 the transparent organic layer is 1.5-3.5 $\mu$ m.

1           30. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the dielectric  
3 constant of the color-filter units is 3.5-5.0.

1           31. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the thickness of  
3 the color-filter units is 1.0-2.0 $\mu$ m.

1           32. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the color-filter  
3 units includes red, green and blue units.

1           33. The method of fabricating an integrated color  
2 filter as claimed in claim 25, wherein the pixel  
3 electrodes are made of indium tin oxide.